

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 19, 2010 has been entered.

Allowable Subject Matter

The indicated allowability of claims is withdrawn in view of the newly discovered reference(s) to Walt et al. (US 6720007 B2) and further evaluation of Tsubokawa et al. (JP 05-295052) of record. Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 102

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3- 5, 8, 9, 11-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Tsubokawa et al. (JP 05-295052, machine translation).

Tsubokawa discloses inorganic metal oxides complex comprising grafted vinyl polymer on the surface of the metal particle. The reference teaches a peroxy group or an azo group is introduced as a polymerization initiator to the surface of inorganic fine particle such as silica or titanium oxide. See translation, [0008-0010]. A peroxy carbonate group-containing monomer such as t-butyl peroxyallyl carbonate is radically polymerized with a copolymerizable vinyl monomer at a temperature less than or equal

to 90°C to graft the vinyl polymer containing peroxy carbonate group at the side chain onto the surface of the inorganic fine particle. A vinyl monomer is radically polymerized at a temperature greater than 90 °C by using the peroxy carbonate group of the graft chain on the surface of the inorganic fine particles as a polymerization initiator to give the final product.

In the instant claims, the limitations "wherein the metal oxide complex powder is obtained by polymerization in the presence of a transition metal complex" and "the metal oxide complex powder is obtained by polymerization in the presence of a halogenated copper and an organic compound capable of coordinating with copper" indicate that the claimed product is produced in the presence of a catalyst, which does not affect the structure of the resulting product itself. See instant claims 1, 8, 9. Thus the prior art metal oxide/polymer complex powder comprising a polymerization initiator deposited onto the oxide powder anticipates the presently claimed product, the only difference being the method of controlling the reaction rate.

The amounts of the metal oxides and reagents used in the reaction are disclosed in [0025-26]; instant claims 11 and 12.

The UV shielding ability delta T of instant claims 13 and 14 of the same surface grafted metal oxide is inherently present in the prior art metal oxide complex.

The reference discloses titanium oxide having mean particle diameter of 120 nm. See translation, p. 8; instant claims 15 and 16.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-19 are rejected under 35 U.S.C. 103(a) as being unpatentable in view of Tsubokawa et al. (JP 05-295052, machine translation) over Walt et al. (US 6720007 B2).

Tsubokawa discloses inorganic metal oxides complex comprising grafted vinyl polymer on the surface of the metal particle. The reference teaches a peroxy group or an azo group is introduced as a polymerization initiator to the surface of inorganic fine particle such as silica or titanium oxide. See translation, [0008-0010]. A peroxy carbonate group-containing monomer such as t-butyl peroxyallyl carbonate is radically polymerized with a copolymerizable vinyl monomer at a temperature less than or equal to 90°C to graft the vinyl polymer containing peroxy carbonate group at the side chain onto the surface of the inorganic fine particle. A vinyl monomer is radically polymerized at a temperature greater than 90 °C by using the peroxy carbonate group of the graft chain on the surface of the inorganic fine particles as a polymerization initiator to give the final product.

While Tsubokawa fails to specifically mention zinc oxide or cerium oxide, such would have been an obvious choice given the teaching of the reference which indicates that any inorganic metal oxide having reactive group on the surface (i.e., oxide) can be used. See instant claims 18 and 19.

Tsubokawa fails to teach a halogenated alkyl group used in the polymerization initiation process. See instant claim 10.

Walt teaches poly(benzyl methacrylate) coated silica microspheres that are prepared by living radical polymerization. The reference teaches silica beads and dry p-xylene, in the presence of copper chloride, 2,2'-dipyridyl and benzyl methacrylate were added to the same reaction mixture shell microspheres which compositions which has polymerized coating. See col. 10, lines 19 – 56. The reference teaches the initiator is attached to the surface of silica microparticles to initiate atom transfer radical polymerization. Examples of suitable initiators such as phenyl ethyl chloride or 2-bromoethylisobutyrate and monomers which are suitable with the living polymerization procedure are disclosed in col. 6, line 44 – col. 7, line 77. See instant claims 3 and 6. The reference teaches the hollow polymer particles with outer diameters in the range of 1-5 microns or 300-500 nm are used in the production of synthetic pigments. See col. 7, bridging paragraph. Applications of the polymeric hollow microspheres as drug delivery system in the fields of medicine and protection of light sensitive compounds, etc. are also disclosed. See col. 7, line 46 - 8, bridging par.

Walt teaches the polymeric hollow microspheres thus prepared may have several advantages over "current methods for preparing synthetic pigments" in that shell thickness can be more accurately than in other known methods, which results in better control of the opacity of the resulting pigment. Secondly, since polydispersity of the polymer in the spheres also influences opacity, living polymerization methods also

allows better control of polydispersity and uniformity of the particle surface. See col. 8, lines 12 -26.

It would have been obvious to one of ordinary skill in the art at the time of the present invention to modify the teachings of Tsubokawa by producing metal oxide/polymeric complex with the living radical polymerization method which is described in Walt. The skilled artisan would have been motivated to do so as the latter teaches the living radical polymerization method allows more accurate control of the polymeric layer thickness, opacity and polydispersity and uniformity of the particle surface. Since Tsubokawa teaches surface graft can be carried out on any inorganic particles such as silica or titanium oxide via radical polymerization, and Walt teaches surface graft method on silica by living radical polymerization and discloses suitable initiators, polymeric monomers and transition metal complex to activate the process, a person of ordinary skill in the art would have had a reasonable expectation of success in producing metal oxide/polymer complexes with the polymerization process of Walt.

Conclusion

No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GINA C. YU whose telephone number is (571)272-8605. The examiner can normally be reached on Monday through Friday, from 9:00AM until 5:00 PM..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Fereydoun G. Sajjadi can be reached on 571-272-3311. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/GINA C. YU/
Primary Examiner, Art Unit 1617